New Developments in FM Systems for Infants and Children

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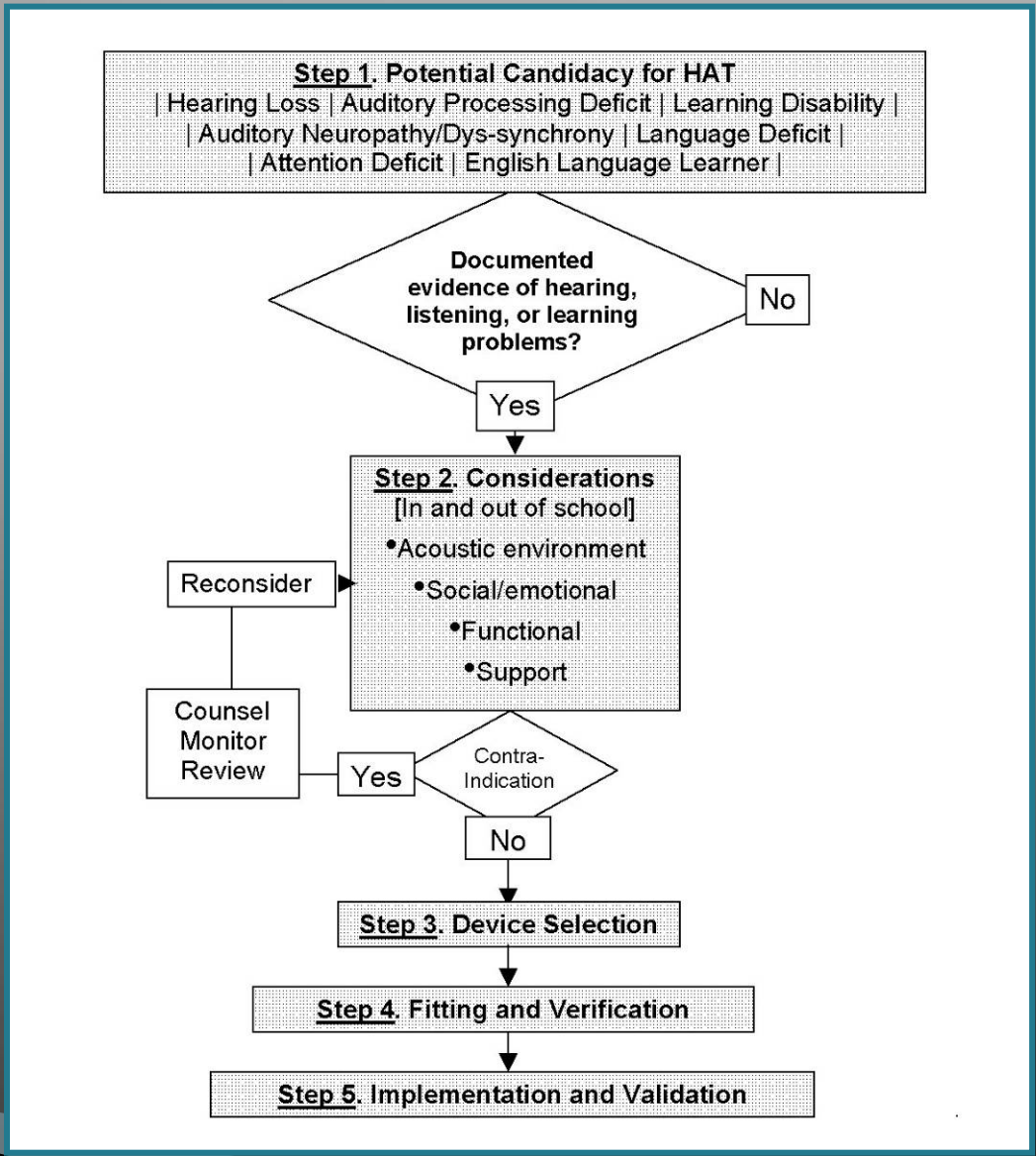
Technology Choices

- Current FM Technology
  - Transmitters
  - Receivers
- Using FM features for pediatric populations
  - Infants and children under 2 years
  - Preschool
  - Elementary School
  - Secondary School

AAA HAT Guideline
5-Step Implementation Process

http://www.audiology.org/resources/documentlibrary/Pages/HearingAssistanceTechnologies.aspx



General Device Considerations

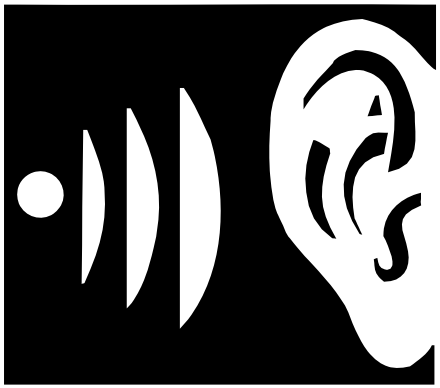
- Ease of accessing FM program
  - Auto (EasyFM) / Manual / Start-up
- Access to battery and ON/OFF with FM attached
- Wear and tear with FM attached
  - How often does FM receiver get removed or replaced
- Overall size with FM attached
- Balance of primary talker (FM) to other talkers (HA)

Transmitter Technology

- Dynamic FM
  - Adaptive FM level
  - Noise processing
- FM Monitoring
  - Receiver Check
  - Sound Check of FM microphone
  - Datalogging
- Multi-Talker Networks
- Voice Activity Detection

Dynamic FM

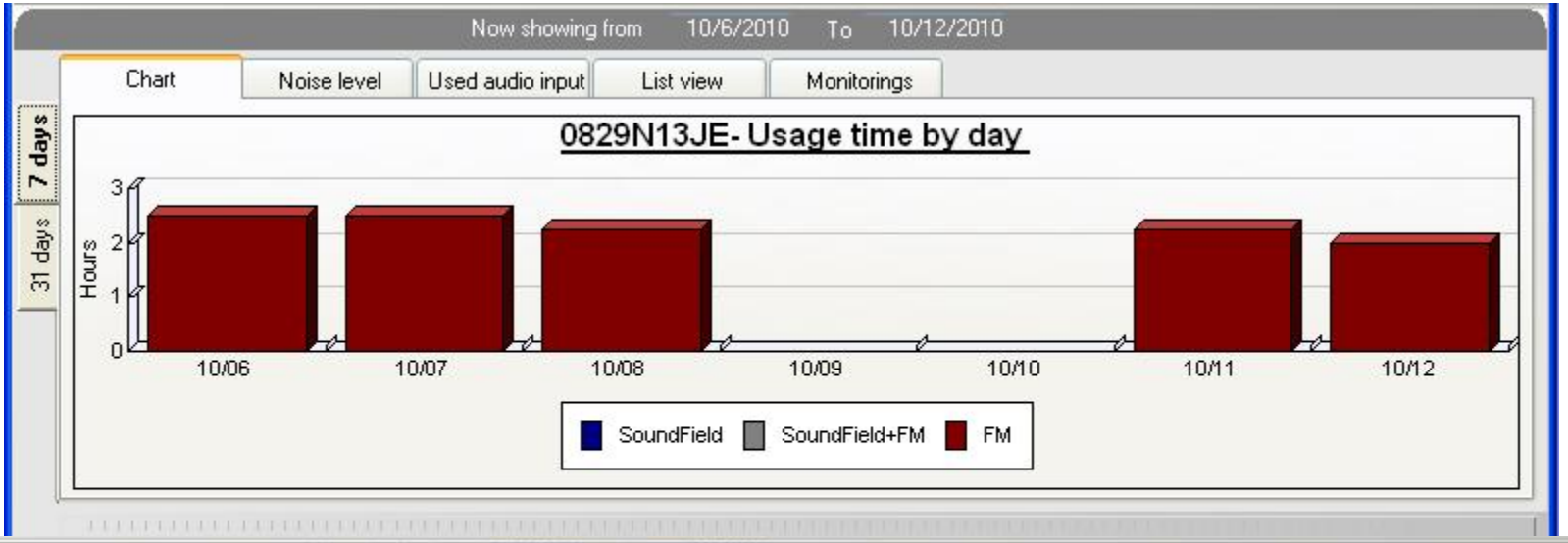
- Adaptive FM Advantage
  - FM level increases with increasing background noise level up to max of +15 dB FM Level over hearing aid microphone level
  - FM level begins to change when noise level exceeds 57 dB
  - Beginning FM level is still programmable

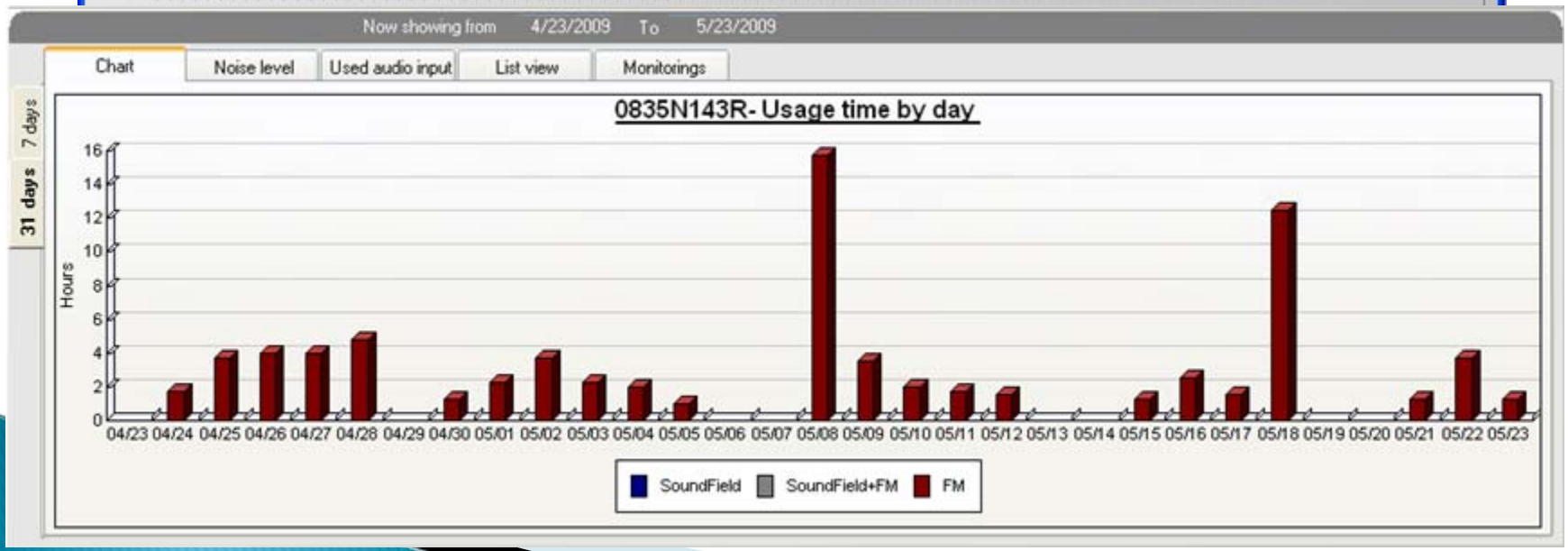


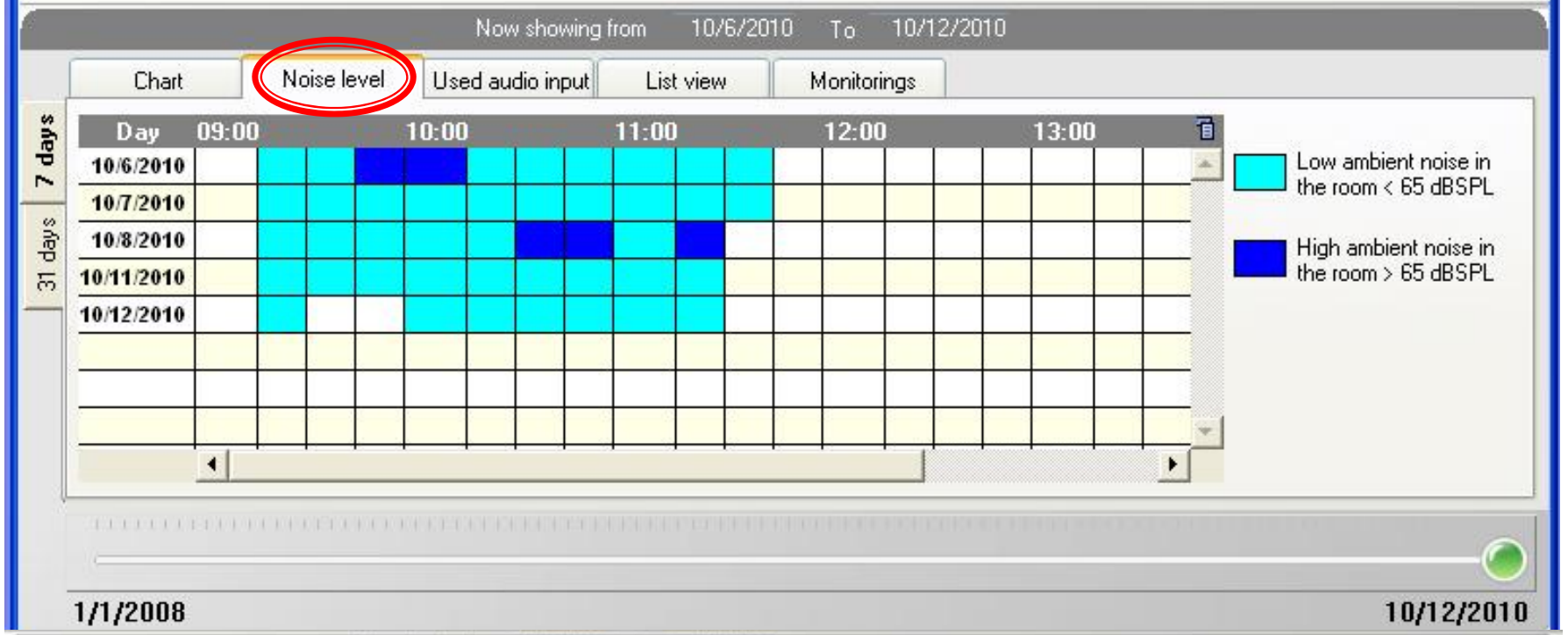
Transmitter / Receiver Datalogging

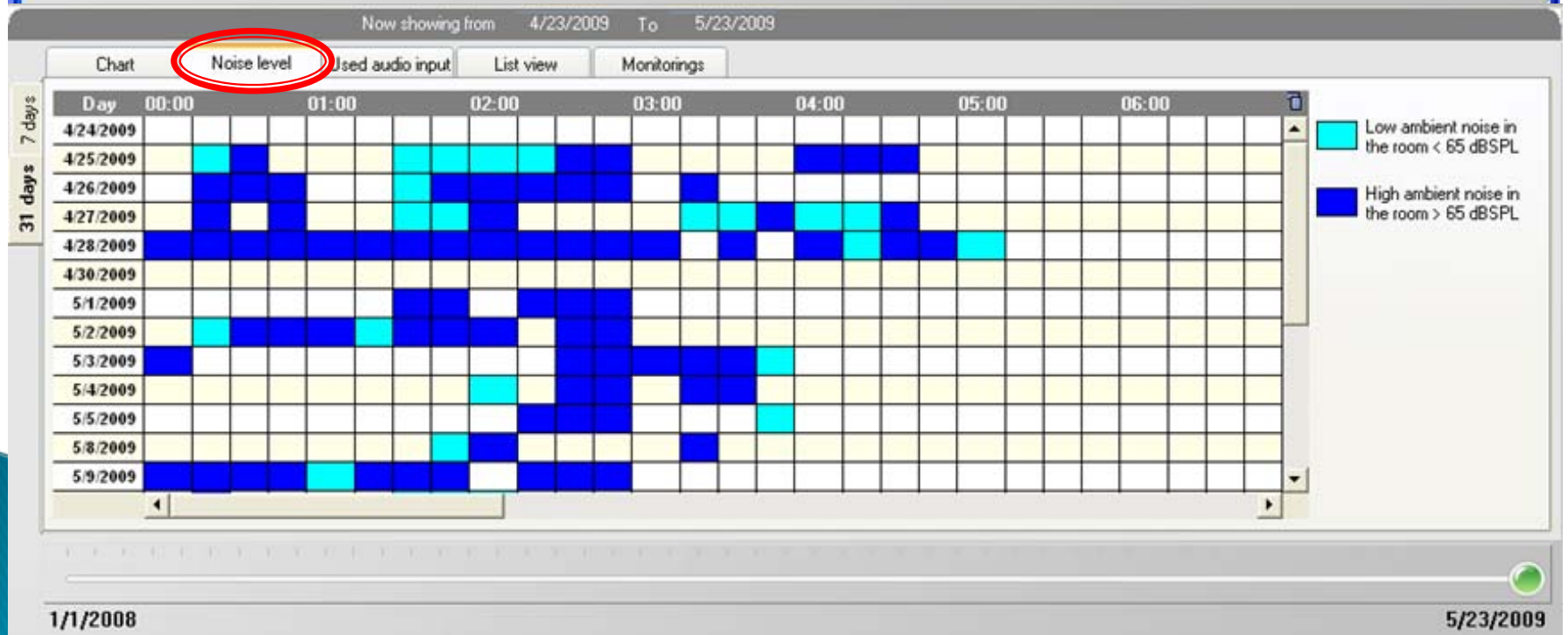
- Transmitter Usage Time
- Noise Levels @ Transmitter
- Input Usage
  - iLapel / iBoom / Auxiliary input
- Records monitoring activities

Monitoring Transmitter Usage






Now showing from 10/6/2010 To 10/12/2010
Chart
Noise level
Used audio input
List view
Monitorings
7 days
31 days
Day
09:00
10:00
11:00
12:00
13:00
10/6/2010
10/7/2010
10/8/2010
10/11/2010
10/12/2010
Low ambient noise in the room < 65 dBSPL
High ambient noise in the room > 65 dBSPL
1/1/2008
10/12/2010


Now showing from 4/23/2009 To 5/23/2009
Chart
Noise level
Used audio input
List view
Monitorings
7 days
31 days
Day
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03:00
04:00
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06:00
4/24/2009
4/25/2009
4/26/2009
4/27/2009
4/28/2009
4/30/2009
5/1/2009
5/2/2009
5/3/2009
5/4/2009
5/5/2009
5/8/2009
5/9/2009
Low ambient noise in the room < 65 dBSPL
High ambient noise in the room > 65 dBSPL
1/1/2008
5/23/2009

Multi-Talker Networks

- Allows team teaching transmission
  - Inspiro to Inspiro
  - DynaMic to Inspiro
- Primary teacher / talker is maintained
- Requires coordination of talkers and activities

FM microphone directionality

- iLapel microphone option has directional features
- Switchable directionality – SmartLink+ / Zoomlink+ / Amigo

Universal FM Receivers

- Switchable between DAI-compatible HA models and manufacturers and CI
- Programmable / Adjustable FM Level

R2

DAI Boots

Dedicated FM Receivers

- Semi-integrated into BTE case via battery door
- Smaller overall size when attached to BTE
- Programmable / Adjustable FM Level
- Usually Family-owned system

Combined HA+FM (R12)

General Assumptions when using Ear-Level FM Receivers

- Gain/Output characteristics of system are determined by hearing instrument settings
- Hearing instrument has been set for appropriate output and audibility with a variety of speech inputs
- Hearing instrument adjustments are coordinated between dispensing audiologist and educational audiologist

Other FM Receiver Interfaces

- MyLink+
- Arc
- iCom
- iSense
- Dynamic SF

General Candidacy Considerations

- Acoustical Environment
  - Noise / Distance / Reverberation
- Social / Emotional Factors
  - Family Support / Classroom Culture / Motivation / Self-Advocacy
- Functional Factors
  - Age / Communication Skills / Communication Environment
- Support Factors
  - Financial / Monitoring & Managing Equipment

School / Clinical Collaboration

- Dispensing audiologist keeps educational audiologist informed when new hearing aids are fit
  - Appropriate battery doors & DAI shoes available
- Hearing aids may need programming to access FM input – who is responsible?
- Decisions about EasyFM / autoFM access are decided as a team
- School provides FM equipment for Dispensing Audiologist to verify FM OR Educational Audiologist verifies FM

School / Clinical Collaboration

- Who provides teacher training and on-going monitoring?
- What happens if the hearing aids are not set appropriately for child and FM?
- What happens if the child's personal hearing aids are not functioning?

FM Priorities for children under 2 years

- Monitoring functions
- Datalogging information
- Smallest FM receiver as possible
- Loss prevention
- EasyFM or AutoFM reduces switches needed
- Dedicated FM receiver with inspiro transmitter
- Training on appropriate environments for use

FM Priorities for Preschool Age

- Monitoring functions
- Datalogging information
- Loss prevention
- EasyFM or AutoFM reduces switches needed
- School & Home use will determine best type of FM receiver combination
- Team Teaching microphones must be considered carefully
- Consider manually syncing in different pre-school learning modules / stations

Urban School Settings

- Dedicated Educational Audiology support
- High numbers of hearing impaired students in school system
  - FM system must be available even when child does not have functional personal hearing aids
  - Education district may choose to provide the entire Amplification System
    - Stock of hearing aids, universal FM receivers and FM transmitters which are all the same

Rural School Settings

- 1 or 2 students with hearing-impairment in school system
- FM system depends on child having personal hearing aids that function
- Rural school settings typically need limited number of FM systems that stay with the same student over several grades
- Limited or no Educational Audiology support
  - Dispensing audiologist may take role of educational audiology consultant
  - No one in child's school building has any familiarity with FM system monitoring / function

FM Priorities for Primary Grades

- Monitoring functions are more critical in lower primary grades
- Consider needs for Multi-talkers versus Level-based instruction
- Adaptability with classroom soundfield systems, Smartboards

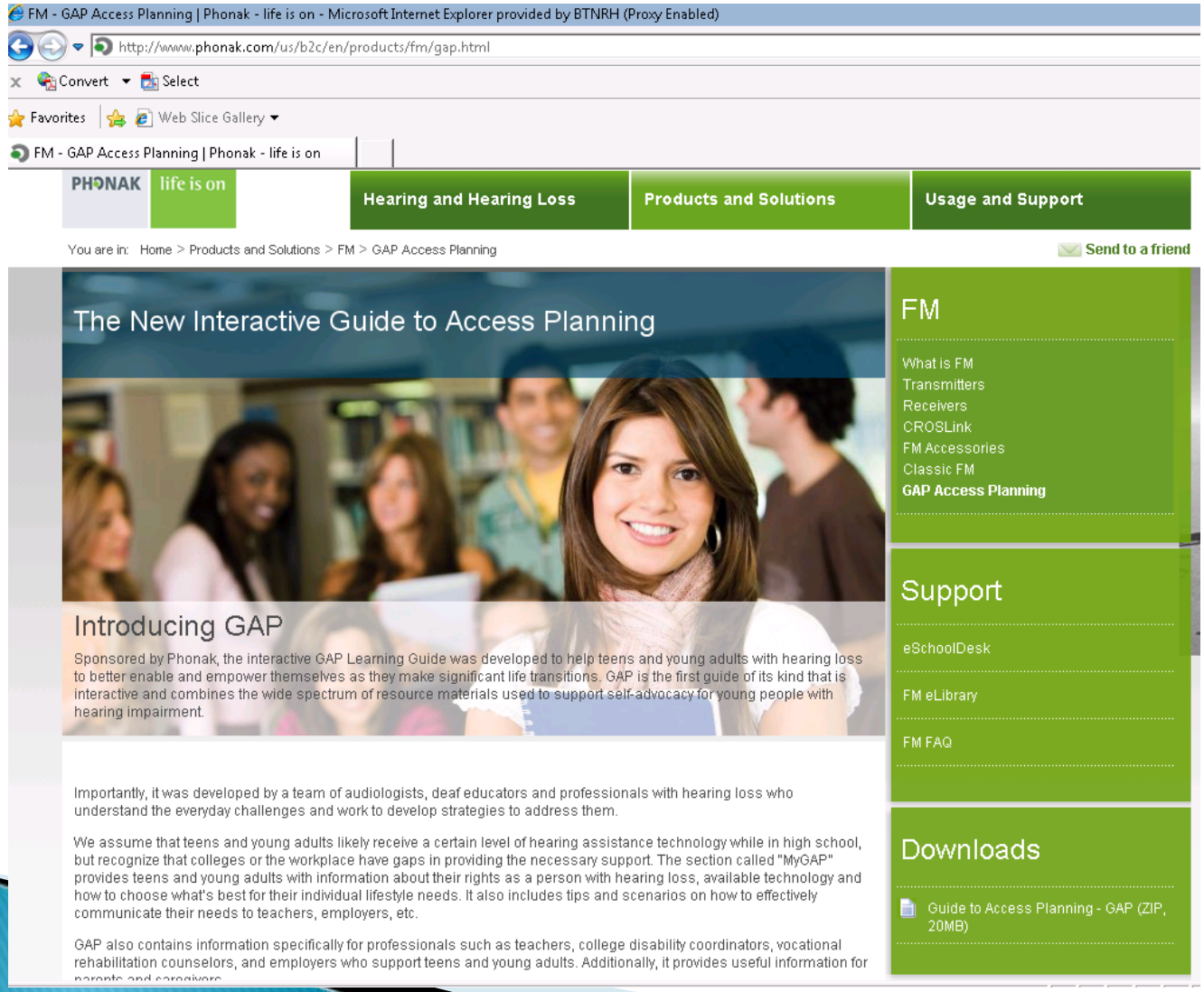
FM Priorities Beyond Primary Grades

- Steps to maintain best chance of FM use into secondary grades
  - Evaluate classes where FM most needed
  - Minimal visibility of FM receiver itself
  - Minimal disruption of class flow (transportation of FM mic and ease of function)
- Ease of switching teachers & rooms makes ZoomLink+/EasyLink+ or other lavalier transmitter-mic preferable
- iCom with MLxi or MyLink+

Secondary Grades and Beyond!

- Transition planning begins ahead of time
- Consider iCom/FM receiver combination for a flexible combination to assist college students
  - Bilateral FM input with 1 FM receiver
  - Bluetooth for cell phone & iPod
  - Direct inputs for other devices
- ZoomLink+ for increased flexibility of use in and out of traditional lecture situations

Secondary Grades and Beyond!

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